cocks is received beneath in a little box: a sloping channel leads from every box across the bottom of a trough filled with sand, which mingles with the water and flows out in separate streams that are conducted to each of the saw cuts. In the first construction of this apparatus for the feed, the sloping channels were led straight across the bottom of the sand trough, but it was then found that the water excavated little tunnels in the sand, through which it flowed without carrying the sand down. This difficulty was overcome by leading the channels across the bottom of the trough in a curved line, when viewed in plan. The form of the channels is shown in fig. 2,

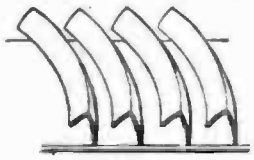

Fig. 2.

which represents four channels cut across the middle of their length, to show their section, from which it will be seen that the channels are made as a series of Gothic-shaped tunnels supported only on the one side, and open on the other for the admission of the sand: the water flows through these tunnels, and continually washing against the convex side of the channel undermines the sand, which falls into the water and is carried down: to assist this action the attendant occasionally stirs up the sand to loosen it. There is a sand trough and set of channels on each side of the water cistern, so that every saw cut receives two streams of sand and water in the course of its length.

The saws having been adjusted to the proper distances for the required slabs, the saw frame is raised by means of a windlass and the suspending chains attached to the vertical frames, and the block of marble to be sawn is mounted upon a low carriage, and drawn into its position beneath the saws, and adjusted by wedges. The saws are then lowered until they rest upon the block, the counterpoise weights are adjusted, and the mixed sand and water allowed to run upon the saw blades, which are put in motion by attaching the connecting rod to the pendulum. The sawing then proceeds mechanically until the block is divided into slabs, the weight of the saw frame and connecting rod causing them gradually to descend with the progress of the cutting.

To allow the sand and water to flow readily beneath the edges of the saw blades, it is desirable that the horizontal frame should be slightly lifted at the end of each stroke. This is effected by making the lower edges of the frame, which bear upon the guide pulleys, straight for nearly the full length of the stroke, but with a short portion at each end made as an inclined plane, which on passing over the guide pulleys lifts the frame just sufficiently to allow the feed to flow beneath the saws.*

ENGINE CHIMNEYS.

Having an order to design an engine chimney of a pleasing outline, I drew a curve from the neck to the base line, the shaft being 10 diameters high and the neck one-third the diameter of the base.

Upon applying my compasses to form sectional plans of the structure I found that the circles touching each other of the outline I had drawn increased uniformly from the top downwards, giving apparently an easy geometrical method of producing entasis in every description of column. I have applied the system to various columnar orders, and I believe it is scarcely possible to improve the entasis produced in this manner. The larger the scale of the drawing the more satisfactory will be found the result, whatever may be the ratio of increase in the circles. The method appears to give facility for the accurate setting out of any column without the use of unwieldy trammels or distant centres.

* To be continued.

I should be glad to have the opinion of experienced chimney-builders as to the different internal plans of engine chimneys. In this neighbourhood (Bristol) all the chimneys are cones following nearly the external form. Is there any advantage to be obtained by making the lower end of the flue as small as the orifice at the top? If so, may such internal flue be constructed as a separate cone, bonded or not to the outer one, or must it be part of the solid fabric.

S. C. F.

THE ARCHITECTURAL PUBLICATION SOCIETY.

Part III., due to the subscribers of 1850, has been issued, and Part I., for 1851, is just ready. The committee, up to this time, have fairly fulfilled all their obligations, and the subscribers have so much reason to be satisfied with the return they have had for their money as to justify them in pressing others to become members, and so increase the means at the disposal of the executive.

The text for 1850 consists of an Essay on Heat, by Mr. R. S. Burn; an Essay on Ventilation, by the same; an Essay on the Principles and Practice of Architectural Design, by Mr. Wightwick; and a continuation of the list of terms connected with the art, and forming the skeleton of the proposed *Cyclopædia*, the great work to which the efforts of the Society all tend.* The essays on Heat and Ventilation contain useful information. "The Principles and Practice of Architectural Design," is somewhat too large a title for six pages of letter-press.

Books.

Chemistry of the Four Ancient Elements, Fire, Air, Earth, and Water: an Essay founded upon Lectures delivered before her most gracious Majesty the Queen. By Thomas Griffiths, Professor of Chemistry in the Medical College of St. Bartholomew's Hospital. Second edition. Parker, Strand. 1851.

Mr. Griffiths's book is well suited to effect its designed object, namely, to excite feelings of interest regarding the fascinating science of chemistry. It is, therefore, chiefly intended for those who have not studied the science, and indeed is not even meant as a student's book so much as a mere easy introduction to the more formal study of the science. Nevertheless, "the four ancient elements," as Professor Griffiths calls them, will be here found to embrace, in a general way, the whole range of chemistry, all known substances ranging themselves under some relation or other to these four forms of existence,—the solid, fluid, aeriform, and pyriform. It is questionable, perhaps, whether the *original* idea of the more enlightened ancients in comprehending all natural substances under these "four ancient" forms meant anything else, or was really designed to signify a belief in four *elements* rather than four *forms* of matter. Even fire the ancient chymists or alchemists can be proved to have *divided into two species*, "combustible fire" and "incombustible fire;" so that whatever was their belief, it was really *not* that fire was *one of four elements*. In all probability their incombustible fire was oxygen itself, with which the higher order of them were perfectly well acquainted, as well as with hydrogen. While thus doing justice to the originators of the idea of "the four ancient elements," however, we must also remark that this author, in his introductory chapter on alchemy, opens a loophole, to which they are not entitled, for their escape from the charge of being the vilest of impostors, unless alchemy were much more than a mere *search* for an agent or agents to combine with lead, &c., and thus to constitute gold and silver. In giving some attention to the history of chemistry, we dipped into several of the more authentic records of alchemy, and uniformly found that the authors made no mere pretence to be in search of such agents, and in hope of finding them, but gave express instructions, such as they were, though in enigmatical forms, how to prepare them; just as Professor Griffiths might, how to prepare certain acids and alkalis wherewith to form certain neutral salts. It is very erroneous, therefore, to state, as he and most other modern chemists do, that the ancient alchemists merely *hoped* to *find* such agents, and merely *searched* for them,—although *students* of their enigmatical instructions merely did so. There must be a reconsideration of this subject, and the alchemists, one and all of them (mere students excepted), must either be condemned, out and out, as the basest of liars and grossest of impostors, or their pretensions be fully recognised and acceded to: they cannot rank in the class of mere dreaming enthusiasts at all.

As a specimen of the work, we may quote the following remarks on lime:—

"Lime is well known, and generally obtained from a variety of marble called limestone, which is very abundant in many parts of England: and if it be heated red hot in kilns, the lime remains as a white solid mass, popularly called quick-lime, or live-lime, in allusion to its active, strong, and caustic nature, as it corrodes and destroys animal and vegetable substances with great facility.

Lime has a very powerful affinity for water, which, when poured upon it, combines with the evolution of great heat: this operation is called slaking the lime, and is conducted on a large scale by builders before mixing the lime with sand for mortar, which is of inestimable value in architecture, where stone, marble, or brick-work require cementing together, as it sets or hardens into a very solid compact mass.

When lime, or any other substance, combines with water, the result is called a hydrate (the term being derived from the Greek ὕδωρ, water); but it does not necessarily imply that an actual solution of the substance takes place, although such is frequently the case to a considerable extent.

Thus, if slaked lime be mixed with water into the consistence of cream, and allowed to remain at rest for some hours in a stoppered glass bottle, the greater part of the lime will subside or precipitate to the bottom, leaving a perfectly clear liquid, containing only a very little lime in actual solution, but tasting strongly acrid, and having the property of restoring the blue colour to litmus-paper, which has been reddened by an acid: it is one of the substances called alkaline, and it combines with, or neutralises acids.

The aqueous solution of lime obtained in the foregoing process is called lime-water: it undergoes a curious change when poured into a shallow dish, and exposed for some hours to the air: it becomes covered with a white film, and loses its acrid taste, and action upon the test-paper.

In many former experiments lime-water was employed as a test for carbonic acid; and the change just alluded to depends upon the formation of carbonate of lime, from a very minute quantity of carbonic acid, which air invariably contains, in addition to its larger essential elements, nitrogen and oxygen.

The fact is, that the lime contained in the lime-water, when exposed to air, reverts chemically to the same state as that in which it existed in the limestone previous to the action of heat, limestone being a natural compound of carbonic acid and lime, or carbonate of lime.

The affinity between these two substances being destroyed by fire or heat, the carbonic acid evaporates along with the smoke of the furnace, whilst the lime remains in a pure state, but ready to unite again with carbonic acid, whenever it may be presented: for this reason pure lime-water is used as a test of carbonic acid, be it produced by combustion, respiration, or any other means.

Limestone, or marble, which is chemically the same substance, may be also decomposed by a powerful agent, called muriatic acid (from the Latin word *muria*, sea-salt, because extracted from sea-salt): this acid will immediately liberate the vapour in question, so that

* The committee are extremely anxious that this desirable work should be commenced, and invite the attention of the members and the profession to this list of terms: they also request the contribution of drawings and articles for subjects contained in that list under the letter A.